

## **APPENDIX E**

### **E. Field Key for the Sunset Crater Volcano National Monument Vegetation Community Descriptions and Map Classes**

1. Site characterized by sparsely vegetated substrate (<2%) or by infrastructure. (go to 23)
1. Site with greater than 2% vegetation, may be within lava bed, cinder, scree, or rock outcrop. (go to 2)
2. Site characterized by tree and/or shrub cover. (go to 3)
2. Site characterized by grasses and forbs, trees may be present. (go to 15)
3. Site characterized by trees. (go to 4)
3. Site characterized by shrubs. (go to 19)

## TREES

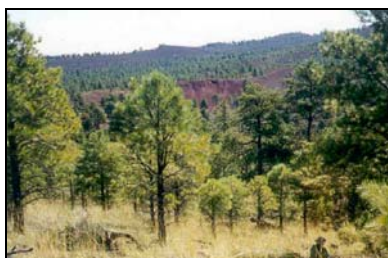
4. Site an island of vegetation within a lava bed or at the edge of lava beds. Map Class: **Lava Beds Sparse Vegetation**. Association is *Populus tremuloides* or *Pinus ponderosa* in the overstory and *Fallugia paradoxa* and/or *Holodiscus dumosus* in the understory. *Pinus ponderosa* - (*Populus tremuloides*) / *Fallugia paradoxa* - (*Holodiscus dumosus*) **Lava Bed Sparse Vegetation**. (see picture below)



4. Site not as above. (5)
5. Trees mostly evergreen. (6)
5. Trees mostly deciduous. Dominant tree is *Populus tremuloides*. This is often less than 0.5ha and is combined with adjacent vegetation communities in the vegetation map. Association is ***Populus tremuloides* / Cinder Woodland (Local Assemblage)**. (see picture below) However, a separate coverage, SUCR\_aspen, shows some photointerpreted occurrences for this association.



6. Dominant tree is *Pinus ponderosa*. *Pinus edulis*, *Juniperus osteosperma* or *J. deppeana* may be present and with equal cover. *Pseudotsuga menziesii* may be present, but with less cover than *Pinus ponderosa*. (7)
6. Dominant tree species not *Pinus ponderosa* or if so, *Pseudotsuga menziesii* is co-dominant. (12)
7. Herbaceous cover greater than 5% and is the dominant understory lifeform. Shrub cover generally less than 10% and not dominated by *Fallugia paradoxa*. If shrub cover more than 10%, it is still less than the herbaceous cover. (8)
7. Shrub cover dominated by *Fallugia paradoxa* or all understory cover (shrubs and grasses combined) 5% or less. (11)
8. Herbaceous cover is dominated by *Andropogon hallii*.  
Map Class: **Ponderosa Pine / Sand Bluestem Woodland**. (see picture below)  
Association is *Pinus ponderosa* / *Andropogon hallii* Woodland.



8. Dominant grass not as above. (9)
9. Herbaceous cover is dominated by *Bouteloua gracilis*. *Muhlenbergia montana*, is not present or has very low cover (<2%). Map Class: **Ponderosa Pine/Montane Grass Mosaic**. (see picture below) Association is *Pinus ponderosa* / *Bouteloua gracilis* Woodland.



9. *Bouteloua gracilis* not dominant or if so, *Muhlenbergia montana* with equal or greater cover than *Bouteloua gracilis*. (10)
10. Herbaceous cover is often dominated by *Muhlenbergia montana*. *Bouteloua gracilis*, if present, can co-dominate, but often has less cover than *Muhlenbergia montana*. Map Class: **Ponderosa Pine/Montane Grass Mosaic**. (see picture below) Association is *Pinus ponderosa* / *Muhlenbergia montana* Woodland.



10. Herbaceous cover is dominated by non-native exotic species such as *Bromus tectorum* and/or *Linaria dalmatica* ssp. *dalmatica* and/or native disturbance following species such as *Artemisia dracunculus*. Map Class: **Ponderosa Pine Invasive Herbaceous Vegetation**. (see picture below) Association is *Pinus ponderosa* **Wooded Invasive Herbaceous Vegetation (Local Assemblage)**.



11. Shrub cover greater than 5% and dominated by *Fallugia paradoxa*. Some areas may also contain high cover of *Ericameria nauseosa*. Map Class: **Ponderosa Pine / Apache Plume Woodland**. (see picture on left below) If *Pinus edulis* is greater than 10% then the modifier “pinyon” applies. If total cover is less than 25% then the modifier “sparse” applies. (see picture on right below) Association is *Pinus ponderosa* / *Fallugia paradoxa* **Woodland**.



11. Shrub and herbaceous cover generally less than 5% total. Map Class: **Ponderosa Pine / Cinder Woodland**. (see picture below) Association is *Pinus ponderosa* / **Cinder Woodland**.



12. Dominant tree species is *Pinus flexilis*. *Pseudotsuga menziesii*, if present, has less cover than *Pinus flexilis*. Map Class: **Limber Pine Woodland**. (see picture below) Association is *Pinus flexilis* Woodland Alliance.



12. Dominant tree species is not *Pinus flexilis* or is *Pinus flexilis* with *Pseudotsuga menziesii* co-dominating. (13)
13. Dominant or associated dominant tree species is *Pseudotsuga menziesii*. *Pinus flexilis* or *Pinus ponderosa* may be present and have equal cover to *Pseudotsuga menziesii*. Map Class: **Douglas-fir Forest**. (see picture below) Association has herbaceous understory dominated by *Muhlenbergia montana*: *Pseudotsuga menziesii* / *Muhlenbergia montana* Forest, otherwise *Pseudotsuga menziesii* Forest Alliance.  
(No picture available)
13. Dominant tree species is *Pinus edulis*. *Juniperus osteosperma* may be co-dominant but does not need to be present. *Juniperus deppeana* may be present. Map Class: **Pinyon Pine – Utah Juniper / Blue Grama Woodland**. (see picture below) If total cover is less than 25% then the modifier “sparse” applies. Continue key to vegetation association (14)



14. *Juniperus osteosperma* or *Juniperus deppeana* are present. Herbaceous cover, if present, characterized by *Bouteloua gracilis*. Association is *Pinus edulis* – (*Juniperus osteosperma*) / (*Bouteloua gracilis*) Woodland. (see picture below)





14. Neither *Juniperus osteosperma* or *Juniperus deppeana* are present. Association is ***Pinus edulis* / Sparse Understory Forest.** (see picture below)



#### GRASSES

15. Dominant grass is *Andropogon hallii*. Map Class: **Sand Bluestem Herbaceous Vegetation.** (see picture below) Association is ***Andropogon hallii* Colorado Plateau Herbaceous Vegetation.**



15. Dominant grass not as above. (16)
16. Herbaceous cover is dominated by *Bouteloua gracilis*. *Muhlenbergia montana*, if present, has less cover than *Bouteloua gracilis*. Map Class: **Montane Grassland.** (see picture below) If *Ericameria nauseosa* is greater than 10% then the modifier “rabbitbrush” applies. If the site is in Bonito Park then the modifier “Bonito Park” applies. Association: ***Bouteloua gracilis* Herbaceous Vegetation.**



16. Dominant grass not as above. (17)
17. Herbaceous cover is dominated by *Muhlenbergia montana*, *Bouteloua gracilis*, if present, has less cover than *Muhlenbergia montana*. Map Class: **Montane Grassland**. (see picture below) If *Ericameria nauseosa* is greater than 10%, then the modifier “rabbitbrush” applies. If the site is in Bonito Park then the modifier “Bonito Park” applies. Association is ***Muhlenbergia montana* Herbaceous Vegetation**.



17. Dominant grass not as above (18).
18. Herbaceous cover is dominated by *Pascopyrum smithii*. Map Class: **Ponderosa Pine Invasive Herbaceous Vegetation**. (see picture below) Association is ***Pascopyrum smithii* Herbaceous Vegetation**.



18. Herbaceous cover is dominated by non-native exotic species such as *Bromus tectorum* and/or *Linaria dalmatica ssp. dalmatica*. Native disturbance following species such as *Artemisia dracunculus* may also be present. *Pinus ponderosa* present but cover less than herbaceous cover. Map Class: **Ponderosa Pine Invasive Herbaceous Vegetation**. (see picture below) Association is ***Pinus ponderosa* Wooded Invasive Herbaceous Vegetation (Local Assemblage)**.



## SHRUBS

19. *Eriogonum corymbosum* is the dominant shrub. *Andropogon hallii* also present. Map Class: **Wild Buckwheat – Sand Bluestem Sparse Vegetation**. (see picture below) Association is *Eriogonum corymbosum* Cinder Sparse Vegetation.



19. Dominant shrub not as above. (20)
20. *Fallugia paradoxa* is the dominant shrub. Map Class: **Apache Plume / Cinder Sparse Vegetation**. (see picture below) Association is *Fallugia paradoxa* (*Atriplex canescens*, *Ephedra torreyana*) Cinder Sparse Vegetation.



20. Dominant shrub not as above. (21)
21. *Rhus trilobata* is the dominant shrub. *Pinus ponderosa* is also present with low cover (up to 5%). This is often less than 0.5ha and was combined with adjacent vegetation communities for the vegetation map. Association is *Pinus ponderosa* / *Rhus trilobata* **Shrubland (Local Assemblage)**. (see picture below) (Continue key to surrounding vegetation community for map class)





21. Dominant shrub not as above and occurring on lava and basalt outcrops. Map Class: **Rock Outcrop and Scree Shrubland**. Continue key to get to vegetation association (22).
22. *Holodiscus dumosus* is the dominant shrub. Found on basaltic and cinder scree. Association is **Fallugia paradoxa – Brickellia grandiflora – (*Holodiscus dumosus*) Scree Shrubland (Local Assemblage)**. (see picture below)



22. *Ericameria nauseosa* and *Pericome caudata* are the dominant shrubs. Found on lava and basalt outcrops. Association is ***Ericameria nauseosa*-*Pericome caudata* Rock Outcrop Sparse Vegetation (Local Assemblage)**. (see picture below)



## SPARSE VEGETATION

23. Site characterized by sparsely vegetated cinder or lava. (24)
23. Site characterized by land use. (25)
24. Substrate loose cinder. Map Class: **Cinder Barren Sparse Vegetation**. (see picture below)



24. Substrate lava. Map Class: **Lava Beds.** (see picture below)



25. Site characterized by land use. Map Classes below.
- a. **Croplands and pastures**
  - b. **Facilities**
  - c. **Recreational tracks:** This map class occurs often as linear polygons within many of the map classes on the vegetation map. These tracks are easily identified in the aerial photography and were included as a separate coverage, suc<sub>r</sub>\_OHV.
  - d. **Residential land**
  - e. **Strip Mines, Quarries, Gravel Pits**
  - f. **Transportation, communications and utilities**
  - g. **Reservoirs and Trick Tanks**